GOOD WORKMAN PRACTICES FOR POWER DISTRIBUTION LINE CONNECTIONS

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by

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DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

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Abstract

Defective electrical connections in power distribution systems will result many circuit and equipment failures. Power distribution loss reduction and power system reliability improvement are becoming very important vicinities to be investigated. There are several methods available for power distribution loss reduction. Energy losses by connectors installed in power distribution network is one of the highly concerned. Quality of power line connections directly affects the power system reliability. Compression connectors or compression joints are a popular type of connectors used for joining or terminating conductors in power distribution network.

Identification of good workman practices for power distribution line connections is important to make the power system more reliable. Standardization of process of power line connector installation and proper die selection technique for compression connectors are essential for power system reliability improvements. This study is an attempt to identify good workman practices required for making perfect power distribution line connections. This will be a guide in the assembly and preventive maintenance of efficient electrical connections for power distribution circuits. An efficient connection shows minimum resistance, both at initial assembly and in the long run.

Data and experience gained through usage on power line connectors by Ceylon Electricity Board (CEB) is the basis of this study. The results of tests carried out on power distribution line connections are incorporated in the recommendations. Properties of conductor metals and metal oxides are discussed. These illustrate requirements of recommended methods of making connections. Requirement for the proper selection of connectors, the proper preparation of conductors, and the proper application of fusion, compression, and bolted connectors are identified. Standards available on power line connectors are discussed to illustrate effective workman practices. Photographs of bad workman practices are included with explanations.

Mathematical formula is developed for calculating correct die size for compression connectors. Amount of material available in connector and conductor are compared with area inside the suggested die for determining the correct die size. Performance identification of any type of connector installed in a power line is carried out by thermal imaging. Thermal images taken from few installed connectors are included and a procedure for assessing connector performance is suggested.

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Acronyms

AAAC-All Aluminium Alloy Conductor

AAC- All Aluminium Conductor

ABC-Arial Bundled Conductor

ACSR-Aluminium Conductor Steel Reinforced

AGM-Additional General Manager

AWG-American Wire Gauge

CCSR-Copper Cable Steel Reinforced

CE-Chief Engineer

CEB-Ceylon Electricity Board

CM-Circular Mill

DDLO switch-Drop Down Lift Off Switch

DGM-Deputy General Manager

EE-Electrical Engineer

FSD-Fuse Switch Disconnector

HRC Fuse- High Rupturing Capacity Fuse

LCD-Liquid Cristal Display

LV- Low Voltage

MCCB-Molded Case Circuit Breaker

MV- Medium Voltage

PG Clamp-Parallel Grove Clamp

SWG-Standard Wire Gauge